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Description

Bottom-Fill Container and Opening System

Cross Reference to Related Applications

[0001] This application claims the benefit under 35 U.S.C. section 119(e) of United States provisional patent application serial no. 60/481,177 filed August 4, 2003, pending.

Background of Invention

[0002] Technical Field -- The invention generally relates to receptacles and to the end wall structure of a container such as a plastic or metal container. More specifically, as applied to a plastic or metal container, the invention relates to the structure of the end wall. The invention also relates to method and apparatus for forming the wall structure. The invention also generally relates to sheet metal container making.

[0003] Background Art -- Metal containers are produced in two-piece and three-piece constructions. Three-piece containers are constructed from a cylindrical sidewall piece and

two independent end wall pieces. The latter are applied to the respective ends of the sidewall to form a closed container. Two-piece containers are constructed from a single container body piece that includes both an integral sidewall and end wall, plus one end wall piece that is applied to the open end of the body to form a closed container. Both types of containers are produced in extremely large numbers, which creates an economic incentive to save even small amounts of metal in producing each one.

[0004] The manufacture of two-piece containers such as metallic beverage containers by the draw and iron process is widely practiced. The body of a two-piece container is efficiently produced from a single disc of sheet stock. For efficient use of metal, the thickness of the sheet stock is chosen with consideration for the maximum needed wall thickness, since most metal working processes reduce wall thickness rather than increase it. According to this known technique, sheet metal coil stock of the chosen thickness is fed into a machine called a cupper. There, the sheet is blanked into round discs of metal. After these discs are cut, the cupper processes the discs by forming them into shallow cups, which are substantially wider in diameter than the finished container body. The cup is fur-

ther processed in a body maker machine. Here, a punch pushes each cup through a series of dies. The first die is a redraw die that reduces the diameter of the cup to the eventual diameter of the finished container body. Subsequent dies draw and iron the side walls of the container body, extending them to increased height, generally greater than the finished height of the container. At the termination of the punch's stroke, the punch engages a doming die that configures the bottom wall or closed end of the container body with a concave profile. The opposite, open end of the container body is quite irregular after body making and, thus, the container body is further processed in a trimming machine. There, the irregular wall of the open end is trimmed off, leaving behind a container body of standard dimensions and with a finished lip at its open end. After trimming, the lip is necked-in and flanged as preparation to receive the container lid. The container body is filled with its intended contents, after which the container body is closed by applying the lid to the flanged lip and seaming the edge of the lid to the flanged lip.

[0005] Container ends or lids have been formed in a variety of cross-sectional shapes and by a variety of methods that typically share a basic scheme. Metal sheet stock of a pre-

selected thickness, such as 0.009-inches, is placed in a shell press between shearing dies that come together to shear the edge of a blank in the resulting shape of a disc. The sheet metal stock is chosen to be as thin as possible, with consideration for needed strength to resist pressure in the assembled container. Aluminum having a thickness of 0.009-inches is approximately the thinnest stock that container be used in a container that will hold a pressurized beverage such as a soft drink or beer. The thickness of the stock is substantially the same as the thickness of the blank, and the lid formed from the blank similarly is of approximately the same thickness as the original sheet stock.

[0006] After the blank has been formed, and typically within the same cupper or shell press used to shear the blank from sheet stock, a punch having a ring configuration is applied against the blank, producing a circular lid with a countersink or groove near its periphery and with an upstanding frusto-conical wall or chuck wall rising from the outer edge of the groove. Other portions of the punch apparatus in the shell press form a peripheral flange extending outwardly from the top of the chuck wall. In a further step, the peripheral flange is formed into a downwardly

curled or hooked shape that is better suited to mate with the lip of a container body. The lid is applied over a flanged top edge of a container body as mentioned above, and the peripheral curled wall of the lid is seamed to the top edge of the container body to form a seal.

[0007] It would be desirable to reduce the overall quantity of the metal or other material of construction in a container at selected locations where material thickness is not critical to the strength and pressure resistance of the container.

[0008] Further, it would be desirable to use relatively less metal or other forming material to produce a container of predetermined volume.

[0009] Correspondingly, it would be desirable to increase the fillable capacity of a container without increasing the amount of metal or other forming material necessary to produce the container; or from another perspective, it would be desirable to increase capacity without a proportionately large corresponding increase in cost of materials and forming.

[0010] Still further, it would be desirable to increase the opening size of beverage containers, which presently are limited by the technology of using frangible tabs.

[0011] To achieve the foregoing and other objects and in accor-

dance with the purpose of the present invention, as embodied and broadly described herein, the improved container and method of this invention may comprise the following.

Summary of Invention

[0012] Against the described background, it is therefore a general object of the invention to provide an improved container in which material savings are achieved by extending an end or closure beyond the chime or other limiting structure of the container.

[0013] Another general object of the invention is to provide a structure and method for forming a container with an expanded end volume that contributes to the useful capacity of the container.

[0014] Another object is to provide a new opening system suited for use on a container using an extended bottom wall.

[0015] A related object is to enable the opening of a beverage container to be larger than presently possible with frangible tab technology.

[0016] Additional objects, advantages and novel features of the invention shall be set forth in part in the description that follows, and in part will become apparent to those skilled in the art upon examination of the following or may be

learned by the practice of the invention.

[0017] According to the invention, a container is formed of a side wall of predetermined maximum transverse dimension, having opposite first and second ends at predetermined first and second end lines. A first end wall is seamed to the side wall at the first end line, and a second end wall is in communication with the second end of the side wall. The second end wall includes an extension wall and an end panel. The extension wall is of smaller transverse dimension than the maximum transverse dimension of the side wall, is joined to the side wall at the second end line, and carries the end panel at a position outside the second end line. The end panel includes a pre-formed dispensing opening at a position offset from a center of the end panel. The extension wall carries a cap having a central panel and a depending side skirt, wherein the side skirt overlaps at least a portion of the extension wall, is rotatably engaged on the extension wall and substantially non-removable from the extension wall. The central panel defines a cap opening located in a suitable position to be moved with rotation of the cap between a registered and a non-registered position with respect to the pre-formed dispensing opening.

[0018] Another aspect of the invention is a method of filling a container formed of a side wall of predetermined maximum transverse dimension and having opposite first and second ends at predetermined first and second end lines. A first step is forming the first end of the side wall to receive a first end wall by an interlocking connection. A second step is providing a second end wall in communication with the second end and closing the second end. The second end wall includes an extension wall and an end panel. The extension wall is of smaller transverse dimension than the maximum transverse dimension of the side wall, is joined to the side wall at the second end line, and carries the end panel at a position outside the second end line, thereby establishing an interior container volume extending beyond the second end line. A third step is providing a pre-formed dispensing opening in the end panel at a position offset from a center of the end panel. A fourth step is applying a cap over the end panel. The cap includes a central panel and a side skirt, wherein the side skirt overlaps at least a portion of the extension wall, is rotatably engaged on the extension wall and is substantially non-removable from the extension wall. A fifth step is providing a cap opening in the central panel in a suit-

able position to be moved with rotation of the cap between a registered and a non-registered position with respect to the pre-formed dispensing opening. A sixth step is filling the container with a contents through the first end. A further step, after the filling step, is applying the first end wall to the first end of the side wall by an interlocking connection.

[0019] The accompanying drawings, which are incorporated in and form a part of the specification illustrate preferred embodiments of the present invention, and together with the description, serve to explain the principles of the invention. In the drawings:

Brief Description of Drawings

[0020] Figure 1 is a top plan view of a container in inverted position, such that the traditional bottom end is at the top.

[0021] Figure 2 is a side elevation view of the container of Fig. 1.

[0022] Figure 3 is an enlarged, fragmentary vertical cross-sectional view through the container of Figs. 1 and 2, taken along a vertical plane through line 3--3 of Fig. 1.

[0023] Figure 4 is a fragmentary side-elevation of the container body shown in Fig. 2, with a vertical cross-sectional view of the cap of Figs. 5 and 6 in an applied position.

[0024] Figure 5 is a bottom plan view of an end cap for the container.

[0025] Figure 6 is vertical cross-sectional view of the end cap, taken along a vertical plane through line 6--6 of Fig. 5.

[0026] Figure 7 is a top plan view of a container end suited for three-piece containers.

[0027] Figure 8 is a vertical cross-sectional view of a container end taken along a vertical plane through line 8--8 of Fig. 7.

[0028] Figure 9 is a fragmentary vertical cross-sectional view of two stacked containers, showing opposite container ends used on each and employing the container end of Figs. 7 and 8 on the bottom end of the upper container.

[0029] Figure 10 is a top plan view of a twist cap for the container, showing in phantom hidden portions of a skirt and lug structure.

[0030] Figure 11 is a side elevational view of a container as in Fig. 2, showing a modified twist cap similar to Fig. 10 applied to the container, with the end cap shown in vertical cross-section along the plane of line 11-11 of Fig. 10.

[0031] Figure 12 is a fragmentary vertical cross-sectional view of the twist cap shown Fig. 11, showing a cap vent panel in the end cap of Fig. 11, and showing frangible peripheral

scores for opening the vent.

Detailed Description

[0032] The invention provides a new container body structure and a container end closure structure or lid that increase the useable capacity of the container. The container body and lid may be of the type used in the container art to hold food and beverages. An aspect of the invention is that the container body is preformed to have a dispensing opening in what is commonly regarded as the bottom end. The bottom end is extended beyond the end line of the container sidewall, creating an expanded useable internal volume and creating an extension wall sized to engage a rotatable cap for sealing and unsealing the dispensing opening. The opposite or top end is attached to the side wall by a folded seam, enabling the container to be filled through the top before the top is applied.

[0033] The concept of a bottom end has primary meaning with respect to a two-piece container, although it is applicable to three-piece containers, as well. The bottom end of a two-piece container is the closed end of the container body that is integrally formed with the sidewall. The top is the lid that is applied after the body is filled with its contents. Thus, another distinction between top and bottom

ends is that a container is filled through its top. This distinction is useful for discussing the difference between top and bottom ends of three-piece containers. In either two-piece or three-piece containers, the maximum fill height is limited by the height of the sidewall, as well as by the need to allow room for the lid to be applied. Therefore, the useable capacity of a container has been limited by the height of the sidewall, plus the generally accepted practice of filling a container through its top.

[0034] For purposes of clarity in this specification, certain terminology identifying the ends of a container or container body will have absolute meaning, rather than relative meaning. Thus, terms such as "top" or "top end" of a container body will refer to the traditional top, especially to the end of a two-piece container body that is left open in the body forming process and later receives a lid in order to seal the container body and contents. Correspondingly, "bottom" or "bottom end" will refer to the end of a two-piece container body that is integrally formed with the sidewall in the body forming process.

[0035] Other terms will best aid the description by use of their relative meaning. Terms such as "upper end" or "lower end" will refer to relative positions, such as to the "upper

end" according to a particular drawing view. Thus, the "top end" of a container may be the "lower end" in a certain drawing view. For uniformity, similar absolute and relative terminology will apply to three-piece containers, although the distinction may be less clear.

[0036] With reference to Figs. 1 and 2, a container body 10 is of the two-piece type. The body 10 is shown in an inverted or bottom-end-up position. The container body has a sidewall 11 that forms an open end at its lower end according to the orientation of Fig. 2. At the open end, the sidewall 11 has been necked-in and formed with a flange 12, as is commonly used for seaming-on a closure or panel end. It may be noted that the flange 12 is generally regarded as being at the top end of a traditional two-piece container. The side wall can be regarded as being longitudinally elongated between opposite ends. If the side wall 11 is cylindrical, the height of the cylinder can be viewed as the longitudinal dimension. The side wall 11 is of predetermined longitudinal dimension between top and bottom end lines. The top end line is at the flange 12. The bottom end line us at a bottom taper 14.

[0037] At the upper end of Fig. 2, the bottom end of container body 10 is formed to have a tapered portion 14 that tradi-

tionally identifies the end of the side wall 11. According to a method of manufacture, the tapered portion 14 can be produced at the doming die while the container body is being formed after a cupping operation. The taper 14 next connects to an extension wall 15, which extends generally longitudinally and parallel to the side wall. The extension wall is of a narrower transverse dimension than the majority of the side wall 11.

[0038] The extension wall also carries a means for engaging and retaining a rotatable cap 25, Fig. 5. A suitable means for this purpose is one or more annular ribs, flanges, or the like around extension wall 15. A specific example of such ribs is one or more threads 16, which may be bayonet threads. The thread profile includes one or more stops 18 for substantially preventing an engaged cap 26 from being removed. However, the threads permit a limited degree of twisting motion in two directions. The use of bayonet threads provides a convenient way to apply the cap during manufacture while causing the cap to be substantially non-removable without deforming or damaging the structure of the cap or container. Thus, the threads provide guidance during rotation and maintain the axial or longitudinal positioning of the cap. Due to the relative

narrowness of the extension wall, the transverse dimension of the container with the cap 26 applied may be no greater than the maximum transverse dimension of the side wall 11.

[0039] The view of Fig. 3 shows the bottom end of the container body 10 in greater detail. A bottom end panel 20 is shown at the upper end of the view of Fig. 3. Extension wall 15 supports the bottom end panel 20 beyond the taper 14 of sidewall 11 or any other conventional measurement of the bottom extreme of a commercially produced beverage container. End panel 20 is formed into a substantially planar or slightly convex, domed surface that is disposed approximately perpendicular to the longitudinal axis of the side wall. If desired, the bottom end panel 20 may be structured with ribs, grooves, and other structural features that are generally known in the art of forming lids or containers. Such structures may be radial, annular, or otherwise disposed.

[0040] Bottom end panel 20 defines an opening 22 that may serve as both a filling opening and a dispensing opening. The opening 22 occupies a predefined area of end panel 20 that is less than one-half the panel. For example, the opening 22 is contained within one-half the circle of

panel 20, on a single side of a diametric division line. While a circular opening 20 is shown, other shapes can be selected. A half circle shape, only slightly smaller than one-half of end panel 20, is a possible and optional opening shape. A raised seal bead 24, optionally formed in the material of panel 22, surrounds the opening 22. Optionally, the seal bead 24 is a structure applied separately to the bottom panel 20, rather than being integrally formed. The seal bead 24 provides a seal and pressure containing structure that is applied against the cap 26, described below.

[0041] With reference to Figs. 4-6, a cap 26 is sized to fit over the bottom end of container 10. The bottom end 20 and the cap 26 are substantially round and the cap 26 fits over the bottom end 20 in a concentric relationship. Cap 26 can be produced from plastic or metal material. The cap is formed of a peripheral, depending side skirt 28, Fig. 6, and a central panel 30. A radially inward facing rib, groove, threads or lugs 32 on the inside face of skirt 28 are shaped to engage any type of mated retaining structure on extension wall 15. For example, lugs 32 may engage threads 16 on extension wall 15 of body 10. The cap forms an opening 34 suitably positioned to be register-

able with opening 22 in container bottom 20. The two openings 22, 34 respectively in the container bottom wall 20 and cap 26 may be equally sized.

[0042] The cap 26 carries a sealing means 52 that surrounds opening 34. The sealing means 52 seals against container bottom 20 but allows the cap to be twisted. Seal bead 24 seals against cap panel 30 or sealing means 52 but also permits relative rotation between the cap and the container body. The cap 26 and container 10 are allowed sufficient relative twisting rotation to slide the two openings 22, 34 between non-registered sealed positions and unsealed positions wherein the openings 22 and 34 are registered. The relative positions of the threads 16 on extension wall 15 and the relative positions of the lugs 32 on cap skirt 28 are sufficient to limit the maximum spacing between the cap and end panel 20 to a predetermined maximum dimension. This dimension should be sufficient to ensure the continued effectiveness of the sealing function when the openings 22, 34 are in non-registered position.

[0043] The container body 10 can be assembled with the cap 26 applied over bottom end panel 20. Opening 22 is in a predetermined position with respect to threads 16, and

opening 34 is in a predetermined position with respect to lugs 32, such that the openings are selectively moveable into registered and unregistered positions within the permitted relative rotation between the cap 26 and container 10.

[0044] The cap may be applied with the openings in unregistered position, which permits the container 10 to be inverted and filled through the open top end. If the container is filled via the top, the top end subsequently is sealed by application of a lid to flange 12. However, such a lid need not carry any opening structure. Instead, the end user opens the bottom of container 10 to dispense the contents by twisting the cap 26 to bring the openings 22, 34 into registered position.

[0045] Figs. 5 and 6 show details of the threads or lugs 32 on cap 26. The end of the skirt 28 more distant from panel 30 is formed into a curl 44. Material of the curl is formed into a plurality of lugs 32, best shown in Fig. 5.

[0046] The central panel 30 of cap 26 is generally planar but may be configured with a strengthening form, such as a frusto-conical annular wall 48 near its periphery, spaced inwardly from skirt 28. The shape of the annular wall 48 offsets panel 30 toward curl 44.

[0047] Opening 34 may be located on or aligned with the similar opening in a seal plate 52 that is sized to be more than twice as large as opening 34, measured through an arc from the center point of the cap. Thus, as best shown in Fig. 5 and with respect to a circular opening 22, seal plate 52 is kidney shaped. One end of the kidney shape is suitably sized to contain opening 34. The opposite end of the kidney shape is suitably sized to cover opening 22, indicated in phantom in Fig. 5, without any overlap with opening 34. The seal plate 52 may be formed of a non-metal sealant material, which may be a compressible gasket material, double faced with adhesive.

[0048] When cap 26 is applied to container body 10, the seal plate provides an unbroken annular seal around both cap opening 34 and end opening 22. The end user may break this seal by applying finger pressure through opening 34 against the underlying end wall 20. Alternatively, twisting the cap 26 with respect to the container body 10 may break the seal. If the container 10 is to be filled through opening 22, filling takes place before the cap 26 is applied.

[0049] Thus, the invention produces a significant set of improvements in the art of making containers. First, by extending

the bottom wall, the capacity of a container has been increased, using approximately the same amount of materials as the prior art. Commensurately, the amount of metal used in a container of given capacity has been decreased. Next, relocating the dispensing opening to the bottom wall reduces the cost and quality of materials needed in a container. The prior beverage container art has required special and more expensive metal alloys for forming a traditional lid, since special properties are needed in the material of a lid that also was required to form a frangible tab for opening. Third, a new opening has been created, which can be larger than allowed by the technology of frangible tabs, and which offers an improved ability to reseal the container. Fourth, the extended container is supplied with a stable base in the form of a cap.

[0050] These advantages and improvements can be applied to the three-piece container, as well. Figs. 7-9 show a new lid configuration that can be applied to three-piece containers. Fig. 9 shows a detail of two stacked three-piece containers. The upper container 54 shows a novel end wall or lid 56 attached to the lower end of the container wall by chime 58. The lower container 60 shows a more traditional end wall or lid 62 attached to the top end of

the container wall by chime 64. It should be appreciated that the top end (not shown) of container 54 is constructed identically to the top end 62 of container 60; and likewise, the bottom end 56 of container 54 is constructed identically to the bottom end (not shown) of container 60.

[0051] A comparison of opposite end walls or lids 56 and 62 readily shows the improvement. An extension wall 74, similar to extension wall 15, extends lid 56 longitudinally outwardly from container 54, beyond container chime 58. In comparison, the traditional lid 62 has no extension wall extending longitudinally beyond chime 64. The extended shape of lid 56 provides a relatively increased capacity for container 54. Lid 56 is best viewed as being the bottom end of container 54, as well as being shown at the lower end of container 54 in the view of Fig. 9. Lid 56 increases the capacity of container 54 only if the increase is useable. If lid 56 is a top end of container 54, the capacity increase is not useable because containers are filled from the top and the extra fill would spill out. The container cannot be filled beyond the height of the sidewall, regardless of how high a lid will be applied, subsequently. Consequently, lid 56 provides an increased capacity, or decreased amount of material needed for forming a given

container size, by increasing the bottom volume of the container. After the container is filled, a traditional lid 62 may be applied to seal the top end.

[0052] Figs. 7 and 8 show a suitable configuration for a lid 56. A traditional peripheral curl 72 is seamed to the wall of container 54 at chime 58, Fig. 9. The curl is connected to an annular wall 74, Fig. 8, which extends longitudinally, parallel to the major axis or height of the cylindrical container, to support the central lid panel of lid 56 at a level longitudinally outside curl wall 72. If desired, the lid 56 may be adapted to carry threads 16 on extension wall 74 and to employ the opening system described above, using a twist cap 26.

[0053] The cap 26 allows a suitably configured container 10, 54, 60 to be opened by hand and selectively resealed. The cap 26 is well-suited for use on a beverage container, allowing the container to be opened or resealed multiple times.

[0054] Figs. 10-12 show an embodiment of the cap 26 in which central panel 30 carries an optional vent closure button 76. The location of the vent closure button should be offset from cap opening 34. A variety of locations are suitable. A preferred location is diametrically opposite opening 34, as shown in Fig. 10.

[0055] A peripheral gasket 78 between cap and the juxtaposed parallel end wall of a container may support the cap and provide a selected or limited degree of friction between the cap and container end wall. Gasket 78 is a slidable seal between the cap and container end wall, allowing the cap and container to be relatively rotated. The seal 78 lies radially outside both the dispensing opening and the vent closure button 76. The seal 78 lies radially inside the peripheral frusto-conical wall 48.

[0056] The container may include a seal bead 24 around dispensing opening 22 and a seal or seal plate 52 around the dispensing opening 34 of the cap. The container may be a two-piece container 10 as shown in Fig. 11, in which central panel 30 is juxtaposed to a bottom end panel 20; or the container may be a three-piece container 54 as shown in Fig. 9, in which central panel 30 is juxtaposed to a bottom end panel 56.

[0057] The vent closure button 76 is selectively openable or removable from the cap. Fig. 12 shows a detail view in which the vent button 76 is visually defined by a coined groove 82 partially or fully surrounding the button 76 in the plane of the cap panel 30, on the top face of the cap panel. A score line 80 opposes the groove 82 on the bot-

tom face of the central panel 30. The score line partially or fully surrounds the vent button 76 in the plane of the cap panel 30. The techniques for forming a frangible button 76 are well known. A score line 80 is preferred to only partially encircle the button 76 so that a hinge area remains unscored. Pushing down on the button 76 fractures score line 80 and opens a vent. Button 76 is bent into a gap between the cap and the container end panel 20, which gap is in part established and maintained by the peripheral gasket 78.

[0058] In summary, the invention describes a new container 10 or the two-piece type, or a new container 54, 60 of the three-piece type. The container is suited for use with liquids, whether or not carbonated, as well as other types of contents. The container is formed of a side wall 11, and first and second end walls. The first end wall, conventionally considered to be the top end wall, may be a lid 62 that is attached to a side wall by an interlocking chime or curl 64. The second end wall, conventionally considered to be the bottom end wall, may be either an end wall panel 20 of a two-piece container, or an end wall 56 of a three-piece container. Panel 20 is formed as one piece with the side wall 11. Panel 56 is attached to the side wall by an

interlocking seam, chime or curl 58. An extension wall 15, 74 supports the end wall beyond the traditional termination of the side wall 11.

[0059] The second end wall or central panel 20, 56 is characterized as having a shape in which the second central panel 20, 56 is longitudinally offset from the second end of the side wall 11, extending the volume of the formed container 10, 54 beyond the second end of the side wall 11. In the case of a three-piece container where the second end is attached to the container body by an interlocking connection 58, the second central panel 56 is offset beyond the interlocking connection 58 by an extension wall 74. In the case of a two-piece container where the second end 20 is one-piece with the side wall 11, the second end panel 20 is offset beyond a tapered periphery 14 of the side wall 11 by an extension wall 15. Thus, with either a two-piece container or a three-piece container, the respective end wall or panel 20, 56 is longitudinally offset along the central axis or height of a generally cylindrical side wall 11 to a position beyond a known, formerly limiting structure such as a bottom taper 14 or a bottom chime 58.

[0060] Further, the second end panel 20, 56 may be configured

to have a dispensing opening 22. The dispensing opening is sealed by a covering cap 26 that is carried on the container in sliding or rotatable relationship. Specifically, on a cylindrical container, the cap 26 rotates concentrically with respect to a circular end panel 20. The cap may be attached to the container on a longitudinally extending side wall 15, 74 juxtaposed to the second end panel. This side wall portion 15, 74 may be the same side wall portion supporting the end panel 20, 56 in its longitudinally offset position.

[0061] The covering cap is configured to have a registerable dispensing opening 34, moveable between registered and non-registered positions according to the relative rotational position of the cap 26. One or both dispensing openings 22, 34 are associated with a sealing device 24, 52 for retaining the contents of the container when the two openings are non-registered. During a dispensing operation, the sealing devices also resist leakage of contents into the volume between the cap and end panel.

[0062] Optionally, a peripheral sealing device 78 closes the periphery of the interface between the second end panel and the cap, supports the cap at a predetermined spacing from the end panel, and ensures a selected low level of

turning friction between the cap and the container.

[0063] Optionally, the cap is configured to carry an openable vent communicating with the volume between the cap and the second end panel. When the dispensing openings are registered, the vent is positioned between the sealing devices 24, 52 around the dispensing openings and the peripheral sealing device 78. The vent can be opened by depressing a vent closure button into the space between the cap and the container end panel.

[0064] According to a method of filling the container 10, the container is filled after the second end wall has been formed or applied, but before the first end wall is applied, so as to take advantage of the expanded volume enabled by the offset of the second central panel 20, 56. After the step of filling the container 10, the first end wall is applied to the first end edge of the side wall 11 to seal the container. The first end wall may be characterized as an unbroken panel, not having a pre-established dispensing means. The second end wall may be characterized as including a pre-established dispensing means, which may be chosen from a pre-established aperture and a sheet of covering material held by a frangible interface to the end wall near the aperture. The sheet of covering material may

be slidable with respect to the aperture to selectively uncover the aperture. The sheet of covering material may define a registerable opening positioned such that it uncovers the aperture by registering the opening with the aperture. A travel limiting means may restrict the slidable movement of the covering material with respect to the aperture to a limited range of movement including a covered position and an uncovered position.

[0065] The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be regarded as falling within the scope of the invention.